

**WHAT IS CLAIMED IS:**

1. A showerhead assembly for distributing gases within a processing chamber, comprising:
  - a cylindrical member having an outwardly extending first flange at a first end; and
  - a disk having a plurality of holes formed through a center region of the disk, the disk coupled to the cylindrical member at a second end in a manner that permits relative movement therebetween.
2. The showerhead assembly of claim 1, wherein the cylindrical member further comprises:
  - a second flange extending inwardly between the first end and the second end; and
  - a blocker plate having a plurality of holes formed therein and coupled to the second flange.
3. The showerhead assembly of claim 1, wherein the disk has a coefficient of thermal expansion different from a coefficient of thermal expansion of the cylindrical member.
4. The showerhead assembly of claim 1, wherein the cylindrical member further comprises:
  - a plurality of threaded holes formed in the second end.
5. The showerhead assembly of claim 1, wherein the disk further comprises:
  - a plurality of clearance holes formed therethrough, the clearance holes configured to allow a fastener disposed through one of the clearance holes into one of a plurality of holes formed in the cylindrical member to move radially as the cylindrical member and disk thermally expand at different rates.
6. The showerhead assembly of claim 5, wherein the clearance holes are

radially oriented slots.

7. The showerhead assembly of claim 1 further comprising:
  - a mounting ring coupled to the second end of the cylindrical member; and
  - at least one clamp member coupled to the mounting ring and sandwiching the disk therebetween.

8. The showerhead assembly of claim 7, wherein the clamp member further comprises:

an at least partially cylindrical body; and  
a tab extending radially inward from the body.

9. The showerhead assembly of claim 8, wherein the disk further comprises:

an annular recess formed at the intersection of a first side and an outer edge of the disk and accepting at least a portion of the tab.

10. The showerhead assembly of claim 9, wherein the mounting ring further comprises:

a cylindrical body having a first plurality of holes formed therethrough and a second plurality of holes formed therein, the second plurality of holes adapted to accept a fastener for coupling the clamp member to the mounting ring; and

a lip extending radially inward from the cylindrical body.

11. The showerhead assembly of claim 10, wherein the disk is sandwiched between the lip and tab, and a plurality of fasteners are disposed through the clamp member into the mounting ring radially outward of the disk.

12. The showerhead assembly of claim 8, wherein a surface of the clamp member opposite the clamp ring is recessed below the first side of the disk.

13. The showerhead assembly of claim 8, wherein the clamp member comprises a plurality of segmented arcs.
14. The showerhead assembly of claim 7, wherein at least one of the cylindrical member, clamp member and the clamp ring is nickel.
15. The showerhead assembly of claim 1, wherein disk is nickel or graphite.
16. The showerhead assembly of claim 3, wherein blocker plate is nickel or graphite.
17. The showerhead assembly of claim 1, wherein the disk is graphite.
18. A showerhead assembly for distributing gases within a processing chamber, comprising:
  - a cylindrical member having an outwardly extending flange at a first end;
  - a disk having a plurality of holes formed though a center region of the disk; and
  - a means for coupling the disk to the cylindrical member that allows movement of the disk relative to the cylindrical member.
19. A showerhead assembly for distributing gases within a processing chamber, comprising:
  - a cylindrical member having an outwardly extending flange at a first end;
  - a disk having a plurality of holes formed though a center region of the disk; and
  - a least one clamp member slidably retaining the disk proximate the second end of the cylindrical member.
20. The showerhead assembly of claim 19 further comprising a mounting

ring coupled to the second end of the cylindrical member, the clamp member fastened to the cylindrical member and sandwiching the disk therebetween.

21. The showerhead assembly of claim 20, wherein the clamp member is fastened to the mounting ring radially outward of the disk.

22. The showerhead assembly of claim 19, wherein the clamp member is comprised of a plurality of segmented arcs.

23. A showerhead assembly for distributing gases within a processing chamber, comprising:

an annular mounting ring having a first plurality of holes formed therethrough proximate an outer diameter and a second plurality of holes formed therein;

a disk having an outer edge, a first side and a second side;

a plurality of holes formed though a center portion of the disk;

a recess formed at an intersection of the outer edge and the first side of the disk;

a least one clamp body having at least one clearance hole formed therethrough and adapted to accept a fastener that threads into one of the second plurality of holes formed in the mounting ring; and

a tab extending from the clamp body at least partially into the recess of the disk and adapted to urge the second side of the disk against the annular ring.

24. The showerhead assembly of claim 23, wherein the disk is nickel or graphite.

25. A processing chamber comprising:

a chamber body having walls and a bottom defining a processing region;

a substrate support disposed in the processing region of the chamber body;

a gas box supported by the walls and having a fluid channel disposed therethrough;

a nickel cylindrical member having an outwardly extending first flange at a first end disposed between the gas box and the walls of the chamber body, and a second end extending into the processing region; and

a nickel or graphite faceplate coupled to the second end of the cylindrical member, the faceplate having a plurality of holes formed through a center region of the faceplate.

26. The chamber of claim 25 further comprising:

at least one clamp member retaining the faceplate proximate the cylindrical member.

27. The chamber of claim 26, wherein the clamp member has a tab extending into a recess formed in a perimeter of the faceplate, the clamp member disposed flush with or recessed from a surface of the faceplate facing the substrate support.

28. A processing chamber comprising:

a chamber body having walls and a bottom defining a processing region;

a substrate support disposed in the processing region of the chamber body;

a gas box supported by the walls and having a fluid channel disposed therethrough;

a cylindrical member having an outwardly extending first flange at a first end disposed between the gas box and the walls of the chamber body, and a second end extending into the processing region;

an annular mounting ring coupled to the cylindrical member, the mounting ring having a plurality of holes formed therein;

a disk having an outer edge, a first side and a second side;

a plurality of holes formed through a center portion of the disk;

a recess formed at an intersection of the outer edge and the first side of

the disk;

a least one clamp body having at least one clearance hole formed therethrough and adapted to accept a fastener that threads into one of the plurality of holes formed in the mounting ring; and

a tab extending from the clamp body at least partially into the recess of the disk and adapted to urge the second side of the disk against the annular ring.